PTO/SB/21 (12-97)
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TRANSMITTAL FORM

(To be used for all correspondence after initial filing)

Application No.	10/596,481
Filing Date	June 14, 2006
First Named Inventor	Tapani Honkanen
Group Art Unit	1791
Examiner Name	E. Hug
Attorney Docket Number	METSO-58

Total Number of Pages in This Submission

- ☐ Fee Transmittal Form
- ☐ Fee Attached
- ☐ Amendment / Response
- ☐ After Final
- ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
- ☐ Response to Missing Parts Under 37 CFR 1.52 or 1.53
- ☐ Assignment Papers *(For an Application)*
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- ☐ Licensing-related Papers
- ☐ Petition Routing Slip (PTO/SB/69) And Accompanying Petition
- ☐ To Convert a Provisional Application
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- ☐ Appeal Communication to Board Of Appeals and Interferences
- ☐ Appeal Communication to Group *(Appeal Notice, Brief, Reply Brief)*
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Additional Enclosure(s) *(Please identify below):*
  - PTO SB/44
  - Request for Certificate of Correction with attached relevant pages of record

Certificate
APR 30 2009
of Correction

Remarks

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Firm *or* Individual name	Patrick J.G. Stiennon, Reg. No. 34934
Signature	
Date	April 24, 2009

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Signature		Date	April 24, 2009

PTO/SB/21 (12-97)
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(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO : 7,520,963
DATED : April 21, 2009
INVENTOR(S): Tapani Honkanen et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In column 8, line 3 of the issued patent "rotatablv" should be --rotatably--

In column 8, line 64 of the issued patent "interimeshed" should be --intermeshed--

In column 9, line 40 of the issued patent "rotatablv" should be --rotatably--

In column 10, line 5 of the issued patent "rotatablv" should be --rotatably--

In column 10, line 15 of the issued patent "aear" should be --gear--

In column 10, line 18 of the issued patent "intemeshing" should be --intermeshing--

In column 10, line 23 of the issued patent "shaft:" should be --shaft;--

MAILING ADDRESS OF SENDER:

STIENNON & STIENNON
P.O. Box 1667
Madison, WI 53701-1667

PATENT NO. 7,520,963

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APR 30 2009

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In The United States Patent And Trademark Office

Applicant:	Tapani Honkanen et al.	Date:	April 24, 2009
Date Filed:	June 14, 2006	Docket No.:	METSO-58
App. No.:	10/596,481	Art Unit:	1791
Patent No.:	7,520,963	Issue Date:	April 21, 2009
For:	Equipment for Moving the Roll of a Paper Machine	Examiner:	E. Hug

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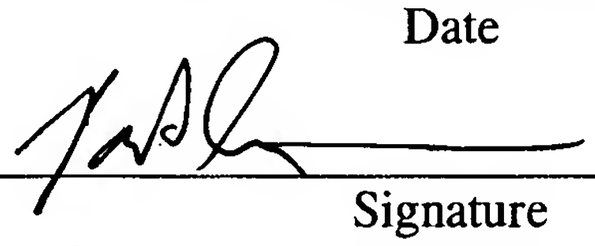

Signature

Patrick J.G. Stiennon, Reg. No. 34934
Name of applicant, assignee or Registered Representative

Request for Certificate of Correction
With Expedited Processing

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant requests that a Certificate of Correction be issued as shown on the PTO/SB/44 enclosed herewith.

This request for correction is incurred solely through the fault of the United States Patent and Trademark Office, as is clearly disclosed in the records of the Office. The accompanying

documentation unequivocally supports this assertion of USPTO error, and includes copies of the relevant pages of the record, so that this request may be processed without the file. The relevant sections of the record have been highlighted in yellow.

Expedited processing is requested under the provisions of the August 21, 2002, Official Notice in 1262 TMOG 96.

Applicant respectfully requests that the typographical errors in the text of the published patent that were not in the original application be corrected by a Certificate of Correction under 37 CFR 1.322.

In column 8, line 3 of the issued patent "rotatablv" should be --rotatably-- as written in the amendment dated December 15, 2008, on page 4, line 4.

In column 8, line 64 of the issued patent "interimeshed" should be --intermeshed-- as written in the amendment dated December 15, 2008, on page 4, line 12.

In column 9, line 40 of the issued patent "rotatablv" should be --rotatably-- as written in the amendment dated December 15, 2008, on page 6, line 7.

In column 10, line 5 of the issued patent "rotatablv" should be --rotatably-- as written in the amendment dated December 15, 2008, on page 8, line 4.

In column 10, line 15 of the issued patent "aear" should be --gear-- as written in the amendment dated December 15, 2008, on page 8, line 11.

In column 10, line 18 of the issued patent "intemeshing" should be --intermeshing-- as written in the amendment dated December 15, 2008, on page 8, line 13.

In column 10, line 23 of the issued patent "shaft:" should be --shaft;-- as written in the amendment dated December 15, 2008, on page 8, line 17.

Applicant believes that these Office mistakes include at least one error of consequence that merits the issuance of a Certificate of Correction as it is of such a nature that the intended meaning may not be obvious from the context.

Respectfully submitted,

Patrick J.G. Stiennon, Reg. No. 34934
Attorney for Applicant
Stiennon & Stiennon
612 W. Main St., Suite 201
P.O. Box 1667
Madison, WI 53701-1667
(608) 250-4870

Correct2.res/amdt

Relevant pages from printed U.S. Patent No. 7,520,963

masses will ensure the operation of the circulating lubrication for long enough to avoid bearing damage.

FIG. **5** shows a cross-section of a second embodiment of the equipment according to the invention. The cradle **13** with its pairs of masses **16** and **17** corresponds to that depicted above, the same reference numbers being used for components that are functionally similar. Particularly the drive train differs from that referred to above. First of all, the pair of gears **23** and the auxiliary shafts **26** and **27** are supported on a common and essentially rigid bearing stand **51**. This allows the drive train to be installed separately, which is a significant advantage when installing equipment weighing several thousands of kilos. In addition, the positions and alignments of the auxiliary shafts and especially of the gears relative to each other will remain unchanged, despite the movement of, or installation errors in the drive train. The solution also reduces the amount of installation space required. The motor **21** can be installed as a continuation of the auxiliary shaft **26**, or alternatively above it, which will further reduce the size of the equipment. The broken lines in FIGS. **2** and **5** show the alternative installation position of the motor **21**. By using an additional gear **52**, power is transmitted from the motor **21** to the gear **24**. At the same time, the gear ratio can also be altered by suitable dimensioning of the additional gear.

A second important change is that the adjustment element **33** is arranged as part of the drive device **39**. In other words, the drive device includes an adjustment element, in order to create a phase difference. The use of the solution in question further simplifies the construction of the equipment and reduces the installation space required. The drive device can now be fitted inside the gear **25**. According to the invention, the drive device **39** also includes bearings and a shaft **53**, which is arranged as part of the drive shaft **18**. This makes separate auxiliary shafts and their bearings unnecessary. In practice, the drive device **39** is attached to the gear **25** and the pressure-medium connection **54** that permits the associated rotational motion, for operating the drive device **39** while the gear **25** rotates. FIG. **6***a* shows the drive train without the operating device containing the adjustment element.

For example, a hydraulic rotator cylinder, which is also termed a rotator motor, can be applied as the drive device. The rotator cylinder is shown in FIG. **6***b*. In the rotator cylinder, the linear motion of the piston is converted, for example with the aid of nesting helical gears, into a rotational motion, thus achieving operation of the adjustment element according to the invention. By regulating the hydraulic pressure, the piston is moved, which rotates the shaft through the gears. In practice, the rotator cylinder thus rotates along with the gear. In the starting situation, the effect of the adjustment element is zero, in which case both drive shafts rotate in the same phase. When the phase difference is adjusted, the drive device is used to rotate the adjustment element, thus changing the position of the gear and the drive shaft relative to each other. Thus, the phase difference of the drive shafts and thus the pairs of masses also changes.

The equipment according to the invention is highly reliable in operation and is easy to adjust. In addition, simple components, for instance a normal squirrel-cage motor, can be used. The magnitude of the phase difference can be adjusted independently of the motor. In addition, in a fault situation, damage is avoided, thanks to the automatic return of the adjustment. At the same time, the circulating lubrication system continues to operate uninterruptedly. In addition, the equipment is smaller than previously and can be installed in parts.

The invention claimed is:

1. An apparatus for axially oscillating a roll of a paper machine, comprising:

a cradle mounted for linear motion and having a structure for attachment to the roll;

a first pair of eccentric masses rotatably mounted on the cradle, the first pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a first drive shaft;

a second pair of eccentric masses rotatably mounted on the cradle, the second pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a second drive shaft; and

a drive train, wherein the drive train comprises a motor; a first gear arranged to be driven by the motor, the first gear connected to the first drive shaft;

a second gear mounted about the second drive shaft, the second gear directly intermeshed with the first gear; and an adjustment element, arranged between the second gear and the second drive shaft, and operable to rotate the second drive shaft relative to the first drive shaft in order to change their mutual position and thus to create and adjust a phase difference between the first drive shaft and the second drive shaft.

2. The apparatus of claim **1** further comprising:

a first auxiliary shaft, wherein the first gear is connected to the first drive shaft by the first auxiliary shaft; and

a second auxiliary shaft forming a connection between the adjustment element and the second drive shaft.

3. The apparatus of claim **1**, wherein the motor is an electric motor connected to the first drive shaft.

4. The apparatus of claim **2**, wherein the first gear is arranged on the first auxiliary shaft, and the second gear is arranged on the second auxiliary shaft with the adjustment element arranged between the second gear and the second auxiliary drive shaft.

5. The apparatus of claim **1**, wherein the drive train includes a drive device which is connected to operate the adjustment element to rotate the second drive shaft relative to the first drive shaft, and wherein the drive device is arranged to be self-returning to a initial position.

6. The apparatus of claim **3**, further comprising a circulating lubrication system comprising:

a lubricant feed pump; and

a control system, wherein the motor is arranged to act as a generator for rotating the lubricant feed pump in the case of a power outage.

7. The apparatus of claim **2**, wherein the first gear, the second gear, the first auxiliary shaft, and the second auxiliary shaft are supported on a common and essentially rigid bearing stand.

8. An apparatus for axially oscillating a roll of a paper machine, comprising:

a cradle mounted for linear motion and having a structure for attachment to the roll;

a first pair of eccentric masses rotatablv mounted on the cradle, the first pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a first drive shaft;

a second pair of eccentric masses rotatably mounted on the cradle, the second pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a second drive shaft; and

a drive train, wherein the drive train comprises a motor; a first gear arranged to be driven by the motor, the first gear connected to the first drive shaft;

a second gear interimeshed with the first gear; and an adjustment element, arranged between the second gear and the second drive shaft, and operable to rotate the second drive shaft relative to the first drive shaft in order

to change their mutual position and thus to create and adjust a phase difference between the first drive shaft and the second drive shaft; and

wherein the adjustment element is a sleeve mounted for axial movement relative to the second drive shaft and the second gear.

9. The apparatus of claim **8**, wherein the sleeve transfers a moment from the second drive shaft to the second gear, and wherein the sleeve comprises:

an inner surface with a first shape-locking construction with respect to the second drive shaft; and

an outer surface with a second shape-locking construction with respect to the second gear.

10. The apparatus of claim **9**, wherein one of the first shape-locking construction or the second shape-locking construction comprises:

a first counter surface with spiral grooving; and

a second counter surface with a protrusion arranged according to the spiral grooving of the first counter surface.

11. The apparatus of claim **9**, wherein the outer surface of the adjustment element and the inner surface of the second gear have straight grooving.

12. The apparatus of claim **8**, wherein the sleeve has an inner surface on which is formed a spiral grooving, in which spiral grooving a protrusion arranged on the second drive shaft travels.

13. The apparatus of claim **12**, wherein there are two opposed spiral grooves on the inner surface of the sleeve, and two corresponding protrusions fitted to the second drive shaft or an auxiliary shaft connected to the second drive shaft.

14. An apparatus for axially oscillating a roll of a paper machine, comprising:

a cradle mounted for linear motion and having a structure for attachment to the roll;

a first pair of eccentric masses rotatably mounted on the cradle, the first pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a first drive shaft:

a second pair of eccentric masses rotatablv mounted on the cradle, the second pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a second drive shaft; and

a drive train, wherein the drive train comprises a motor; a first gear arranged to be driven by the motor, the first gear connected to the first drive shaft; a second gear intermeshed with the first gear: and an adjustment element, arranged between the second gear and the second drive shaft, and operable to rotate the second drive shaft relative to the first drive shaft in order to change their mutual position and thus to create and adjust a phase difference between the first drive shaft and the second drive shaft;

wherein the drive train includes a drive device which is connected to operate the adjustment element to rotate the second drive shaft relative to the first drive shaft, and wherein the drive device is arranged to be self-returning to a initial position; and

wherein the adjustment element and the drive device are fitted inside the second gear.

15. The apparatus of claim **14**, wherein the drive device further comprises bearings and a shaft which is arranged as a continuation of the second drive shaft.

16. The apparatus of claim **14**, wherein the drive device includes a pressure-medium connection permitting the rotational motion of the drive device while the second gear rotates.

17. An apparatus for axially oscillating a roll of a paper machine, the apparatus comprising:

a cradle mounted for linear motion and having a structure for attachment to the roll;

a first pair of eccentric masses rotatablv mounted on the cradle, the first pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a first drive shaft:

a second pair of eccentric masses rotatably mounted on the cradle, the second pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a second drive shaft; and

a drive train comprising first and second intermeshing gears driven by a motor, wherein the first drive shaft is driven by said first intermeshing aear or said first intermeshing gear is driven by the first drive shaft, and wherein the second drive shaft is driven by said second intemeshing gear through an adjustment element, the adjustment element operable to rotate the second drive shaft relative to the first drive shaft in order to change their mutual position and thus to create and adjust a phase difference between the first drive shaft and the second drive shaft: and

wherein the adjustment element is a sleeve structured to transmit moment from the second intermeshing gear to the second drive shaft, which sleeve is mounted for axial movement relative to the second drive shaft and the second intermeshing gear, and arranged so that the axial motion of the sleeve causes rotation of the second drive shaft with respect to the second intermeshing gear to create the phase difference between the first drive shaft and the second drive shaft.

18. An apparatus for axially oscillating a roll of a paper machine, the apparatus comprising:

a cradle mounted for linear motion and attachment to the roll to cause axial oscillation of the roll;

a first pair of eccentric masses rotatably mounted on the cradle, the first pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a first drive shaft;

a second pair of eccentric masses rotatably mounted on the cradle, the second pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a second drive shaft;

a motor;

wherein the first drive shaft and a first gear mounted to the first drive shaft are driven by the motor; and

a second gear driven by the first gear, wherein the second drive shaft is driven by said second gear through an adjustment element, the adjustment element operable to rotate the second drive shaft relative to the first drive shaft in order to change their mutual position and thus to adjust a phase difference between the first drive shaft and the second drive shaft; and

wherein the adjustment element is a sleeve structured to transmit moment from the second gear to the second shaft, which sleeve is mounted for axial movement relative to the second drive shaft and the second gear, and arranged so that the axial motion of the sleeve causes rotation of the second shaft with respect to the second gear, to create the phase difference between the first drive shaft and the second drive shaft.

* * * * *

Relevant pages from amendment in U.S. Application No. 10/596,481,
filed on December 15, 2008

22. (currently amended) An apparatus for axially oscillating a roll of a paper machine, comprising:

a cradle mounted for linear motion and having a structure for attachment to the roll;

a first pair of eccentric masses rotatably mounted on the cradle, the first pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a first drive shaft;

a second pair of eccentric masses rotatably mounted on the cradle, the second pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a second drive shaft; and

a drive train, wherein the drive train comprises a motor; a first gear arranged to be driven by the motor, the first gear connected to the first drive shaft;

a second gear intermeshed with the first gear; and an adjustment element, arranged between the second gear and the second drive shaft, and operable to rotate the second drive shaft relative to the first drive shaft in order to change their mutual position and thus to create and adjust a phase difference between the first drive shaft and the second drive shaft; and ~~The apparatus of Claim 17,~~

wherein the adjustment element is a sleeve mounted for axial movement relative to the second drive shaft and the second gear.

23. (previously presented) The apparatus of Claim 22, wherein the sleeve transfers a moment from the second drive shaft to the second gear, and wherein the sleeve comprises:

an inner surface with a first shape-locking construction with respect to the second drive shaft; and

an outer surface with a second shape-locking construction with respect to the second gear.

34. (currently amended) An apparatus for axially oscillating a roll of a paper machine, the apparatus comprising:

a cradle mounted for linear motion and having a structure for attachment to the roll;

a first pair of eccentric masses rotatably mounted on the cradle, the first pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a first drive shaft;

a second pair of eccentric masses rotatably mounted on the cradle, the second pair of eccentric masses being mutually synchronized and arranged to be driven in rotation by a second drive shaft; and

a drive train comprising first and second intermeshing gears driven by a motor,

wherein the first drive shaft is driven by said first intermeshing gear or said first intermeshing gear is driven by the first drive shaft, and wherein the second drive shaft is driven by said second intermeshing gear through an adjustment element, the adjustment element operable to rotate the second drive shaft relative to the first drive shaft in order to change their mutual position and thus to create and adjust a phase difference between the first drive shaft and the second drive shaft; and ~~The apparatus of Claim 33,~~

wherein the adjustment element is a sleeve structured to transmit moment from the second intermeshing gear to the second drive shaft, which sleeve is mounted for axial movement relative to the second drive shaft and the second intermeshing gear, and arranged so that the axial motion of the sleeve causes rotation of the second drive shaft with respect to the second intermeshing gear to create the phase difference between the first drive shaft and the second drive shaft.

35. (canceled)